Amendments to the Claims

This listing of claims replaces all prior versions, and listings, of claims:

Listing of Claims:

1. (Currently Amended) A method of enhancing the quality of a new digital image comprising:

receiving a reference digital image;

receiving a first degraded version of the reference digital image;

receiving a second degraded version of the reference digital image;

deconvolving the reference digital image with the first degraded version of the reference digital image to form ~~an~~ a first enhancement function;

deconvolving the reference digital image with the second degraded version of the reference digital image to form a second enhancement function;

indexing the first enhancement function according to the degree of degradation of the first degraded version of the reference digital image;

indexing the second enhancement function according to the degree of degradation of the second degraded version of the reference digital image;

storing ~~a plurality of~~ the first and second enhancement functions to a storage device;

~~indexing each of the plurality of enhancement functions according to the degree of degradation of the degraded version of the reference digital image utilized to form the enhancement function;~~

receiving ~~the~~ a new digital image;

determining ~~the~~ a degree of degradation of the new digital image;

selecting a stored enhancement function having an index corresponding to ~~a~~ the degree of degradation ~~that~~ of the new digital image;

applying the stored enhancement function to the new digital image to form an enhanced digital image; and

making available the enhanced digital image.

2. (Original) The method of Claim 1 wherein deconvolving the reference digital image with the degraded version of the reference digital image comprises:
computing a two-dimensional transform of the reference digital image;
computing a two-dimensional transform of the degraded version of the reference digital image;
dividing the two-dimensional transform of the reference digital image by the two-dimensional transform of the degraded version of the reference digital image to form a two-dimensional quotient; and
computing a two-dimensional inverse transform of the two-dimensional quotient.

3. (Original) The method of Claim 1 wherein deconvolving the reference digital image with the degraded version of the reference digital image comprises computing a least-squares deconvolution of the reference digital image with the degraded version of the reference digital image.

4. (Original) The method of Claim 1 wherein receiving a degraded version of the reference digital image comprises:
receiving a first degraded version of the reference digital image;
receiving a second degraded version of the reference digital image; and
combining the first and second degraded versions of the reference digital image to form an average degraded version of the reference digital image.

5. (Original) The method of Claim 1 wherein receiving the new digital image comprises transferring the new digital image from a digital camera.

6. (Original) The method of Claim 1 wherein applying an enhancement function comprises:
representing the enhancement function as a digital filter;
applying the new digital image to the input of the digital filter; and
computing the output of the digital filter.

7. (Currently Amended) An apparatus for enhancing the quality of a new digital image comprising:

image receiving unit that receives a digital image;

supervisor capable of causing the image receiving unit to receive a reference digital image, a first degraded version of the reference digital image, a second degraded version of the reference image, and a new digital image;

deconvolution unit that deconvolves the reference digital image with the first degraded version of the reference digital image to form ~~an~~ a first enhancement function and deconvolves the second degraded version of the reference digital image with the reference digital image to form a second enhancement function;

storage unit that stores the first enhancement functions indexed according to the degree of degradation in the first degraded version of the reference digital image and stores the second enhancement function indexed according to the degree of degradation of the second enhancement function;

enhancement application unit that applies a stored enhancement function to the new digital image to form an enhanced digital image based on ~~the~~ a degree of degradation of the new digital image; and

conveyance unit that makes available the enhanced digital image.

8. (Original) The apparatus of Claim 7 herein the deconvolution unit comprises:

two-dimensional transform computing unit capable of computing a two-dimensional transform; and

two-dimensional complex arithmetic unit capable of dividing a first two-dimensional transform by a second two-dimensional transform.

9. (Original) The apparatus of Claim 7 herein the deconvolution unit comprises a least-squares deconvolution unit capable of computing a least-squares deconvolution to form a reference digital image with a degraded version of the reference digital image to form an enhancement function.

10. (Original) The apparatus of Claim 7 further comprising an averaging unit capable of combining a first degraded version of a reference digital image with a second degraded version of the reference digital image to form an average degraded version of the reference digital image.

11. (Original) The apparatus of Claim 7 wherein the image receiving unit comprises an interface to a digital camera.

12. (Original) The apparatus of Claim 7 wherein the enhancement application unit comprises:

digital filter unit-sample response coefficient table that represents the enhancement function;

digital filter capable of accepting the new digital image as input, wherein the digital filter further is capable of producing an output digital image by digitally filtering the input according to the digital filter unit-sample response coefficient table.

13. (Currently Amended) An image quality enhancement computer comprising:

memory capable of storing instructions;

processor capable of executing instruction sequences;

image receiver capable of receiving a digital image and of passing the digital image to the processor;

image processing instruction sequences stored in the memory, said image processing instruction sequences comprising:

deconvolution instruction sequence that, when executed by the processor, minimally causes the processor to:

accept a first digital image from the image receiver;

accept a first degraded version of the first image from the image receiver;

accept a second degraded version of the first image from the image receiver,

form ~~an~~ a first enhancement function by deconvolving the first digital image with the first degraded version of the first digital image,

form a second enhancement function by deconvolving the first digital image with the second degraded version of the first digital image,

indexing instruction sequence that, when executed by the processor, minimally causes the processor to:

store a plurality of enhancement functions to a storage device; ~~and~~

index ~~each of the plurality of~~ the first enhancement functions according to the degree of degradation of the first degraded version of the first image ~~which was used to form the enhancement function~~; and

index the second enhancement function according to the degree of degradation of the second degraded version of the first image; and

enhancement instruction sequence that, when executed by the processor, minimally causes the processor to:

receive an un-enhanced digital image from the image receiver;

~~selecting~~ select a stored enhancement function having an index corresponding to a degree of degradation matching that of the un-enhanced digital image; and

form an enhanced digital image by applying the stored enhancement function to an un-enhanced digital image; and

conveyance interface capable of providing the enhanced digital image.

14. (Original) The image quality enhancement computer of Claim 13 wherein the memory further has stored therein a two-dimensional transform instruction sequence that, when executed by the processor, minimally causes the processor to perform a two-dimensional transform and wherein the processor comprises an arithmetic unit capable of dividing a first two-dimensional transform by a second two-dimensional transform.

15. (Original) The image quality enhancement computer of Claim 13 wherein the deconvolution instruction sequence comprises a least-squares deconvolution instruction sequence that, when executed by the processor, minimally causes the processor to perform a least-squares deconvolution of a first digital image with a second digital image.

16. (Original) The image quality enhancement computer of Claim 13 wherein the memory further has stored therein an average instruction sequence that, when executed by the processor, minimally causes the processor to compute an average of two digital images.

17. (Original) The image quality enhancement computer of Claim 13 wherein the image receiver comprises a digital camera interface capable of receiving a digital image transferred from a digital camera.

18. (Original) The image quality enhancement computer of Claim 13 wherein the memory has stored therein:

digital filter unit-sample response coefficient table that represents the enhancement function; and

digital filter instruction sequence that, when executed by the processor, minimally causes the processor to accept a digital image as input and to produce an output digital image by digitally filtering the input according to the digital filter unit-sample response coefficient table.

19. (Previously Presented) The image quality enhancement computer of Claim 13 wherein the image processing instruction sequences further comprise:

two-dimensional transform instruction sequence that, when executed by the processor, minimally causes the processor to perform a two-dimensional transform and wherein the processor comprises an arithmetic unit capable of computing the product of a first two-dimensional transform and a second two-dimensional transform.

20. (Previously Presented) The method of Claim 1, wherein the degree of degradation is a measure of visual range.

21. (Previously Presented) The method of Claim 7, wherein the degree of degradation is a measure of visual range.

22. (Previously Presented) The method of Claim 13, wherein the degree of degradation is a measure of visual range.